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## SCIENTIFIC BOOKS

*Vorlesungen über allgemeine Histologie gehalten an der Hochschule für Frauen in St. Petersburg.* VON ALEXANDER GURWITSCH. Jena, Gustav Fischer, 1913. Pp. vi + 345. 204 figs.

Professor Gurwitsch has taken seriously his task of instructing the college women of Petrograd. He has prepared for them a course so philosophical that if adopted for American young men, the audience would be restive, if not more disrespectful. But he appreciates that he is not dispensing milk for babes, and quotes Helmholtz that the academic teacher should always be mindful of this—that among his hearers there are perhaps “die besten Köpfe” of the next generation, and they are to be reckoned with. Accordingly he presupposes an “elementary zoological, anatomical and botanical knowledge” on the part of his students, and correctly infers that his work “perhaps makes greater demands upon the attention of the reader than many another compendium of histology.” For this the reader is amply rewarded.

The first of the twenty-two lectures deals with “the position of histology in the system of the biological sciences.” In this abstract consideration, histology is shown to be far removed from a naïve, automatically-recording science, limited only by optical and technical difficulties. Its real difficulties are those of subjective interpretation, and the author ranks it high among the various attempts to secure a better understanding of vital phenomena. But he emphasizes the fact that the study of structure is only one method of approach among many which are available, and “we do not know how far toward the goal it can lead us.”

Each subject discussed in the lectures is introduced with the formulation of a biological problem. Thus the second lecture—on “the fundamental conceptions of microscopic morphology”—begins with the statement that the first and most urgent problem is the endless *multiplicity of forms* which organisms present. Can all organisms be regarded as

various arrangements of one or a few sorts of structural elements? It is then shown that the Protista, from the simplest amebæ and bacteria to the highly organized infusoria, appear irreducible. They show an essential agreement only in the “heterogeneity of their architecture.” But such forms as the hydroid polyps, the vegetative buds of *Equisetum* and embryos of the higher animals, are composed of elements, or cells, which show many more interrelationships and analogies among themselves than are presented by the organisms *in toto*. To this extent the cell theory is justified and significant. In the adults of the higher animals, however, the consideration of striated muscle fibers and of various supporting tissues leads the author to state that the cell theory is here “simply inadequate,” and he finds that “the ground substance, the cell, the fiber (ducts in plants), etc., must be accepted as coordinate descriptive material in our histological inventory.” But he regards granules as having no more general characters than their configuration, and every granule theory is declared illusory.

The third lecture is entitled the “substratum of development,” and approaches the problem of the origin of new organisms. After noting that the earliest beginning of the future organism which can be recognized and individualized as such, has its own antecedent in the maternal organism, not recognizable with the methods of to-day but which may be with those of to-morrow, Dr. Gurwitsch proceeds to consider the ovum, and thus the nature of protoplasm in general. In abbreviated form, he writes:

The investigation of protoplasmic structure is among the pet problems of histology. If only seldom expressed, most of such studies have been inspired by the wish and hope of finding something in the structure of protoplasm which would explain its “properties.” But this hope gradually paled as the investigator became lost in the labyrinth of microscopic pictures. There was a lack of sufficient appreciation of the part which induction plays in apparently so simple a procedure as describing what is seen. Many times we imagine that we accomplish this in a purely objective way, when in

fact we offer an interpretation. Since the pictures admit of different interpretations they must be examined in the light of the physical properties of protoplasm. To have perceived and applied this postulate is the unperishable contribution of Bütschli.

Accordingly nucleus and protoplasm are thoroughly examined in their physical and chemical relations, and the manifold structural forms assumed under the microscope are partially explained by considering protoplasm a very soft gel, near the critical condition. "Under various abnormal or perhaps physiological conditions it may wholly or in part become a sol."

Two lectures are devoted to cell division, and like all other parts of the book, they are illustrated with large, clear, beautifully executed figures, derived from many sources. Collectively they suggest faultless technique and the clearest of objectives. The account of mitosis imparts the fascination which this process still holds upon the lecturer through its inherent mystery, and the subject is left with the following characteristic conclusion:

Why the number of chromosomes and their size are so very different in closely related species or races; why specially in the seminal cells of one representative of the cyclostomes (*Myxine*) peculiarly formed rod-shaped centrosomes appear; why the centrosomes of a particular annelid (*Rhynchelmis*) attain enormous, macroscopically visible dimensions, etc.; these all are problems the rational explanation of which can not be hoped for in the years within sight.

The course continues with a consideration of the following themes: Growth; the substratum of inheritance; shape and structure; the histology of metabolism; change of form and motion; the nervous system; and finally, the possibility of establishing histological laws. Each of these subjects is treated in one or more lectures, with freshness and originality. The two lectures on "shape and structure" state that the adult is characterized by relatively stabile weight and fixed shape, and this condition is attributed to "the high degree of elasticity in the adult organism as contrasted with the plasticity of embryonic stages." The structures accounting for these characteristics

of the adult are then considered—epithelium and its modifications in the first lecture, with the conclusion that "in maintaining the typical shape of the organism, epithelial tissue as such plays a subordinate rôle"; and connective tissue, with cartilage and bone, in the second lecture.

As a whole the lectures are to be highly commended. Their unsolved riddles may perhaps suggest to others, as to the reviewer, the difficulties of Carlyle's *Teufelsdröckh*, but much is in store for the English readers who "accompany him through all his speculations." Of inconsistencies we have noted only one, and can not decide which of the following propositions is correct:

Histological investigation is seldom or only exceptionally able to take the lead over other methods of investigation as a pioneer in unknown lands (p. 11).

Histology belongs essentially to the sciences of discovery, so that histological discoveries have often, or very generally, the same exploratory character as the voyages of the early mariners (p. 4).

FREDERIC T. LEWIS

*Flies in Relation to Disease—Bloodsucking Flies.* By EDWARD HINDLE, B.A., Ph.D. Cambridge University Press, 1914.

This volume is one of the Cambridge Public Health series and complements the recent work on flies in relation to disease by Dr. G. S. Graham-Smith. It was written in collaboration with the distinguished investigator, Major S. R. Christophers, who, for reasons stated in the preface, did not consent to appear as joint author. In its preparation the author was also guided by Professor G. F. H. Nuttall. It is therefore to be supposed that it measures up to the standard set by the noted Quick Professor of Protozoology in Cambridge University. The reader will find as he proceeds through the work that this is the case.

Dr. Hindle's volume deals with the most important field in medical entomology at the present time as its scope includes the treatment of species transmitting such important maladies as malaria, yellow fever, sleeping sickness and others. In this field much activity